R E P O R T R E S U M E S

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THE EFFICACY OF THE INITIAL TEACHING ALPHABET AND THE PEABODY LANGUAGE DEVELOPMENT KIT WITH DISADVANTAGED CHILDREN IN THE PRIMARY GRADES--AN INTERIM REPORT AFTER TWO YEARS.

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DESCRIPTORS- *INITIAL TEACHING ALPHABET, *BASIC READING, *LANGUAGE DEVELOPMENT, *BEGINNING READING, *DISADVANTAGED YOUTH, READING INSTRUCTION, READING ACHIEVEMENT, LANGUAGE ABILITY, INTELLECTUAL DEVELOPMENT,

AN INTERIM REPORT OF A 3-YEAR STUDY OF THE EFFECTIVENESS OF THE INITIAL TEACHING ALPHABET (ITA) AND THE PEABODY LANGUAGE DEVELOPMENT KITS (PLDK) WITH UNDERPRIVILEGED CHILDREN IN BEGINNING READING AND IN STIMULATING ORAL LANGUAGE AND VERBAL INTELLIGENCE IS PRESENTED. FIVE EXPERIMENTAL GROUPS AND ONE CONTROL GROUP WERE DERIVED FROM 17 CLASSES IN NINE SCHOOLS. THE FIVE EXPERIMENTAL GROUPS HAD VARIOUS COMBINATIONS OF ITA, PLDK, AND CONVENTIONAL READING AND VARIOUS LENGTHS OF PLDK TREATMENT, WHILE THE CONTROL GROUP HAD NOTHING BUT CONVENTIONAL READING. PUPIL PROGRESS WAS MEASURED IN READING ACHIEVEMENT, LANGUAGE DEVELOPMENT, AND INTELLECTUAL GROWTH. RESULTS SHOWED THAT THE ITA GROUPS WERE SIGNIFICANTLY ADVANCED IN READING ACHIEVEMENT OVER THE CONVENTIONAL READING GROUP. CHILDREN WITH ITA AND 2 YEARS PLDK MADE MORE READING PROGRESS THAN ANY OTHER GROUP. CHILDREN WITH 1 OR 2 YEARS PLDK MADE GREATER LANGUAGE GAINS THAN THOSE WITHOUT PLDK, AND 2 YEARS OF PLDK PRODUCED GREATER EFFECT THAN 1 YEAR. GROWTH IN INTELLECTUAL DEVELOPMENT WAS ENHANCED IN TERMS OF MA NOT IQ. THESE FINDINGS SUGGEST THAT WHILE USE OF ITA MADE GREATER EFFECTS THAN CONVENTIONAL READING WITH OR WITHOUT PLDK, THE COMBINED ITA AND 2 YEARS OF PLDK WAS MOST EFFECTIVE WITH UNDERPRIVILEGED CHILDREN. REFERENCES AND TABLES ARE INCLUDED. (NS)

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The Efficacy of the Initial Teaching Alphabet and the Peabody Language Development Kit with Disadvantaged Children in the Primary Grades: An Interim Report After Two Years

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The Efficacy of the Initial Teaching Alphabet and the Peabody Language Development Kit with Disadvantaged Children in the Primary Grades: An Interim Report After Two Years*

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Lloyd Dunn, Prayot Pochanart, and Philip Pfost

An adequate education is a vital foundation for children of working class families if they are to improve their socio-economic status. Yet traditionally these children have had difficulty in meeting the demands of the schools which are oriented toward the middle-class. Thus, perhaps the greatest challenge facing educators today is to develop improved methods of teaching such pupils. No doubt there is need for innovations in teaching each aspect of the curriculum to children of poverty. However, it can be argued that language is an especially critical one. By middle-class standards, both poor Southern Negro and Caucasian children come from home and community environments that are impoverished and very different linguistically, yet the role of language is central to human endeavor (Luria, 1961). Three major functions are: (1) a means of communication, (2) an instrument for thought, and (3) a method for regulating behavior. Thus, with increased language facility, the disadvantaged would have a foundation for better communication, for improved intellectual functioning, and for the acquisition of more knowledge. For this reason, it was decided to study the efficacy of two new approaches to language development with children who enter school already retarded in verbal intelligence and oral language proficiency. The study began in the fall, 1964. The findings reported herein constitute an interim report at the completion of two years of an instructional program which is planned to extend over three years, with a follow-up planned after three additional years. The research reported in this article is part of a larger investigation, known as the Cooperative Language Development Project, reported in monograph form (Dunn and Mueller, 1966; Dunn, Pochanart, and Pfost, 1967) which outlines the total study in more detail.

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Purpose

The purpose of this study was to investigate, with underprivileged

* The research reported herein is part of our Cooperative Language Development Project supported by Grant #HD 973 from the National Institute of Child Health and Human Development, and from Ford Foundation funds through the Nashville Education Improvement Project. This experiment was carried out in collaboration with the Nashville Metropolitan Schools. Recognition is due the many teachers and administrators who assisted in this research, particularly M. D. Neely and Carrie Denney who coordinated the program with the school system.

primary grade children, the efficacy of: (1) the Initial Teaching Alphabet (ITA) in teaching beginning reading, and (2) the Peabody Language Development Kits (PLDK) in stimulating oral language and verbal intelligence.

It was predicted that: (1) the use of ITA in beginning reading instruction would enhance reading ability; (2) the use of the PLDK lessons would raise the intelligence quotients (IQ's) of the children while, at the same time, enhancing their oral language development and school achievement, and (3) the ITA plus the PLDK in combination would be even more effective in fostering verbal intelligence, language development, and school achievement.

Treatments

Below are described the two major adaptations made in the curriculum:

Initial Teaching Alphabet

The experimental beginning reading program was carried out using the Early-to-Read Series developed by Mazurkiewicz and Tanyzer (1963). This program consists of eight text books and five workbooks designed to carry the child from a point of beginning reading in ITA through the transition to traditional orthography (TO) at the high third grade level. In contrast to the Downing Reading Series from England which utilizes a sight vocabulary approach, the Mazurkiewicz and Tanyzer program is based on the premise that the children should first learn the individual sound symbols before being taught to synthesize them into words, sentences, paragraphs, and stories. Thus a phonetic rather than a sight vocabulary approach is used.

None of the experimental teachers had used ITA before. They participated in a three-day workshop prior to the opening of school and then were encouraged to follow the reading program in a fairly standard manner. All teachers tended to stress learning of sound symbols in isolation and in key words. Some variability occurred in the extent to which the teachers used experience charts, labels for objects in the rooms, and the bulletin board to give children added experiences to create a familiarity with the ITA system. A small collection of supplementary reading materials in ITA was also used, including a set of the Downing Readers in each classroom, as well as books in traditional orthography. (The controls used a conventional beginning reading program, in this case, the Reading For Meaning Series).

About one-third of the experimental children completed the entire Early-to-Read Series before the end of the first school year. These children were moved into the Basic Reading Series by McCracken and Wolcutt, published by the J. B. Lippincott Company. They began in Book 2-1 which gives a systematic review of the phonetic approach to beginning reading in traditional orthography, and therefore appeared especially appropriate as a follow-up to the Early-to-Read Series. A few who had not gotten through the ITA series by Christmas of the second school year were shifted over to TO regardless of their progress in ITA, and placed in the easier first grade work in the Basic Reading Series.

Peabody Language Development Kit

An experimental edition of Level #1 PLDK designed by Dunn and Smith (1965)

was used in the first year of the study and the experimental edition of Level #2 PLDK (Dunn and Smith, 1966) was used in the second year. The lessons were intended to stimulate oral language and verbal intelligence, and therefore to enhance school progress. Figure 1 outlines a model of the psycholinguistic processes trained by the lessons.

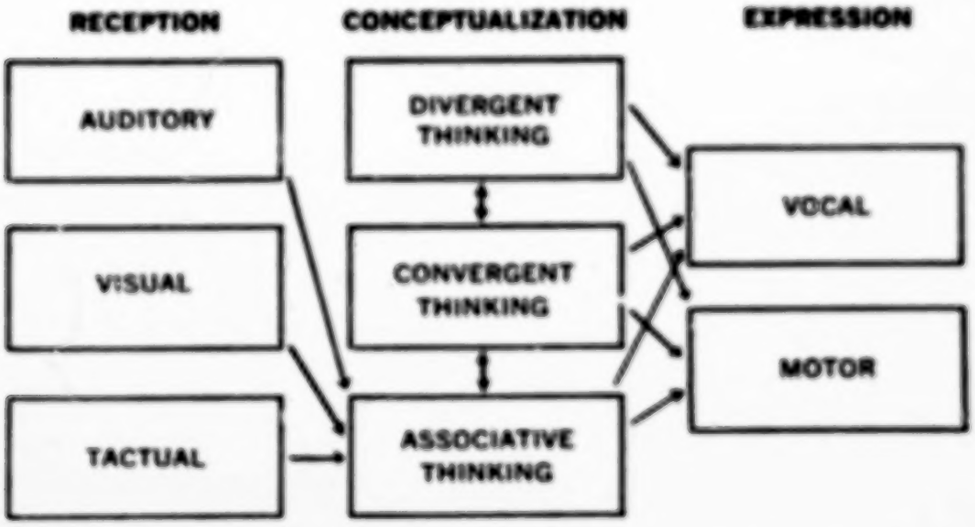

Fig. 1 Model of the Psycholinguistic Processes Trained by the Peabody Language Development Lessons

The Level #2 PLDK is a continuation of the program in Level #1 (See Dunn and Mueller, 1966) and is designed for children whose language ages are in the range six to eight years. Included in the experimental edition were 180 daily lesson plans, each containing three activities from among 24 different categories. Typical were: brainstorming, classification, describing, following directions, imagination, memory, relationships, story time, and vocabulary building. Also in the kit were over 400 picture cards, I Wonder cards, plastic color chips, two hand puppets, and a recorded tape.[1] The lessons are planned to provide 30 - 40 minutes of well-planned oral language stimulation exercises each day. The philosophy of the PLDK is that Language Time should be a half hour interlude from conventional school work. Though early lessons required considerable teacher participation, the overall goal was to maximize the oral language behavior of the pupils, giving them an opportunity to talk, to think, and to learn effectively in a setting that was less structured than during a regular period of school work. The children were never called on either to read or write. In fact, no seat work was involved. The total group participated together, the emphasis being on thinking as well as on talking and understanding conventional English speech.

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[1] Revised versions of both Level #1 and Level #2 of the PLDK are available from American Guidance Service, Inc., Publishers' Building, Circle Pines, Minnesota, 55014.

Groups

From 17 classes in nine schools, five experimental groups and one control group were constituted: Group 1 taught ITA with the transition into the Basic Reading Series (all ITA groups made the transition into the Basic Reading Series); group 2 taught ITA plus one year of PLDK; group 3 used the conventional reading approach plus PLDK for one year; group 4 taught ITA plus two years PLDK; group 5 taught conventional reading plus two years PLDK, and a control group using the conventional reading approach. Figure 2 illustrates pictorially the design.

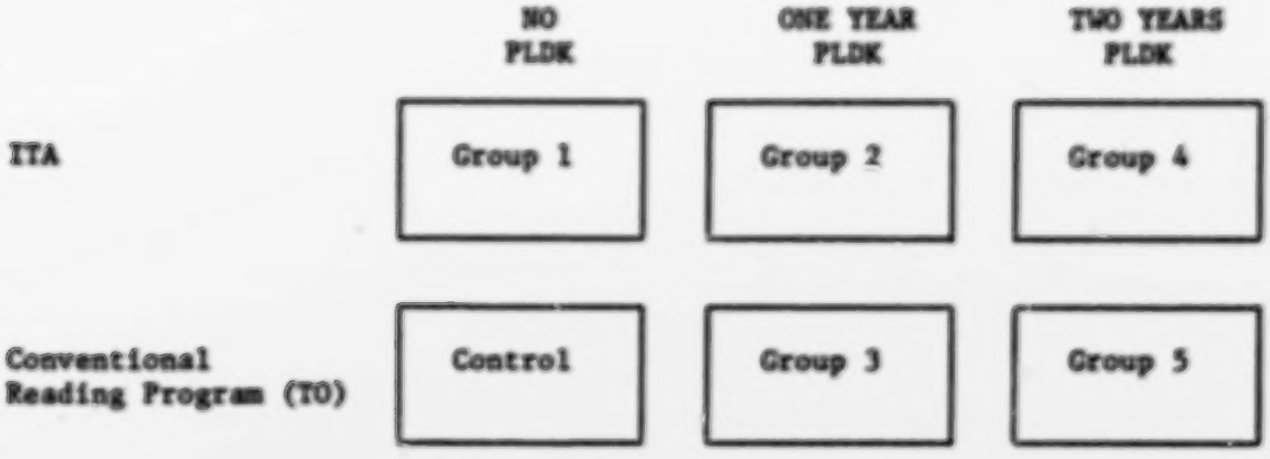

Fig. 2 Pictorial Description of Treatment Groups

During the first year, 1964-65, there were four classes in each of the treatments: ITA only, ITA plus PLDK, and conventional reading plus PLDK. These were arranged in groups of at least two teachers with a similar treatment in a school, across six schools. The control group was drawn from five classes in five schools in the same community. All schools, experimental and control, served children residing in slum areas. For the second year, 1965-66, all rooms in ITA continued in their program, two of the rooms in ITA plus PLDK continued PLDK for the second year (creating group 4), and two of the rooms in TO plus PLDK continued the second year of PLDK (creating group 5).

Subjects

A total group of approximately 1,000 experimental and 130 control subjects were initially selected to take part in the program at the beginning of the first grade. During the first year, complete data were collected on 732 subjects. Administrative considerations dictated that the various experimental treatments be carried out with all children enrolled in the classes involved. As a result, the groups were neither comparable in size nor on such variables as intelligence quotients, mental ages, chronological ages, and language abilities. Therefore, a selected study sample was established by deleting subjects who did not meet criteria set up for culturally disadvantaged children, and then by randomly selecting equal sized

samples of boys and girls from each of the treatment groups. More specifically, children with IQ's above 110, as well as those from adequate housing and socio-economic status were excluded. This reduced the number of subjects in the smallest group to 54 (27 boys and 27 girls). Therefore, subjects in the larger groups were randomly eliminated until the number of all four groups was equated at 54, giving a total study sample of 216. Analyses of variance indicated that the resultant groups were comparable at the outset of the experiment in terms of chronological age, intelligence quotient, mental age, and language age. Basic home information suggested that the level of education of the parent,[2] the number of members in the family, and the type of housing were comparable (See Table III).

At the end of the second year of the treatment, there were 200 subjects with complete test data. The smallest reconstituted group was 22 and the largest group was 44 (See Table I). Again as in the first year, there were equal numbers of boys and girls in each group. In contrast to the first year, analyses of variance of pretest data indicated significant differences between groups on IQ, MA, and language age (See Table II). These differences came about as the result of the division which created treatment groups 4 and 5 mentioned earlier.

Teachers

Involved in the five ITA and PLDK treatments were 12 teachers in a total of six schools--four serving essentially all Negro youth, and two well-integrated with Negro and Caucasian children. Eight of the teachers were Negro and four were Caucasian. Three of the five control schools served solely Negro children and two were integrated. All of the teachers, experimental and control, were grade one teachers with more than one year of experience in teaching, were fully certified in elementary education, and held one or more degrees. Experimental teachers were asked to stay with the same group of children for two years.

The experimental teachers in this study were given a number of incentives not available to the control teachers. They were provided with a small supplementary stipend and were asked to attend in-service training sessions throughout the year averaging approximately one every two weeks. As the first year progressed, the emphasis of these sessions shifted from learning the experimental treatment to discussions of problems arising in connection with the program. The experimental teachers were provided other stimulation. Supplementary materials were purchased. They were frequently visited by the researchers, school officials, and other visitors, and were given considerable recognition by their principals. All experimental teachers had an opportunity to observe each other teach and to share ideas and were visited regularly by a supervisor. Furthermore, they were paired up in schools so they could share informally together their innovations and problems. There was little doubt but what the teachers knew they were part of an experiment. Motivation to

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[2] The level of education of the best educated parent was used.

Table I

Summary of Pretest Data on the Selected Samples Used for the Second Year Analyses

Treatment Group	N	CA		IQ		MA		LA	
		$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S
ITA only									
Boys	22	73.95	3.98	84.73	12.22	63.36	8.65	60.59	9.57
Girls	22	75.45	4.53	84.18	11.73	64.68	8.99	60.55	7.61
Total	44	74.70	4.28	84.45	11.84	64.02	8.74	60.57	8.55
Control (TO only)									
Boys	20	74.90	5.58	80.90	11.78	61.60	8.04	59.95	7.69
Girls	20	73.60	3.97	84.65	7.86	63.30	5.48	62.45	6.61
Total	40	74.25	4.82	82.78	10.07	62.45	6.85	61.20	7.19
ITA-One year PLDK									
Boys	17	76.71	6.59	77.76	10.88	61.12	7.92	60.06	7.46
Girls	17	75.94	6.29	82.06	10.37	63.35	7.66	58.88	6.39
Total	34	76.32	6.35	79.91	10.69	62.23	7.75	59.47	6.87
TO-One year PLDK									
Boys	17	76.94	6.32	83.59	11.94	65.35	7.20	62.24	6.87
Girls	17	77.24	5.60	85.59	8.86	67.24	7.04	63.00	8.71
Total	34	77.09	5.88	84.59	10.40	66.29	7.08	62.62	7.73
ITA-Two years PLDK									
Boys	11	74.27	3.88	91.73	6.92	68.55	3.08	62.64	4.30
Girls	11	73.27	2.90	91.91	9.33	67.82	5.88	66.09	6.47
Total	22	73.77	3.78	91.82	8.02	68.18	4.59	64.36	5.64
TO-Two years PLDK									
Boys	13	78.15	4.00	91.23	7.38	71.92	6.34	70.08	7.88
Girls	13	75.31	6.13	88.23	10.13	67.00	6.23	63.15	6.59
Total	26	76.73	5.27	89.73	8.82	69.46	6.65	66.62	7.95
Grand Total	200	75.45	5.21	84.86	10.82	64.96	7.65	62.06	7.75

Table II

Analysis of Variance of Pretest Data by Treatment Group

Variable	Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	F ratio
CA	Between Groups	11	409.290	37.208	1.399
	Within Groups	188	5000.305	26.597	
	Total	199	5409.595		
IQ	Between Groups	11	3,791.427	81.039	2.612*
	Within Groups	188	20,225.928	7.585	
	Total	199	23,317.355		
MA	Between Groups	11	1,639.856	49.078	2.796*
	Within Groups	188	10,022.739	53.312	
	Total	199	11,662.595		
LA	Between Groups	11	1,478.772	34.434	2.411*
	Within Groups	188	10,480.508	55.747	
	Total	198	11,959.280		

*$F_{.95} = 1.83$

Table III

Basic Home and Family Information on the Selected Samples Used for the Second Year Analysis

Group	N	Percentage of Families on Welfare	Average No. of Children per Family	Average No. of Adults per Family	Mean Educ. Level of Parent*	Housing Conditions In Percentage			
						extremely poor	moderately poor	fair	good
ITA only									
Boys	22	18	3.6	1.9	9.8	43	38	19	-
Girls	22	5	4.3	2.0	10.8	30	25	45	-
Total	44	12	4.0	1.9	10.3	36	32	32	-
Control (TO only)									
Boys	20	7	5.0	2.4	9.9	30	41	29	-
Girls	20	8	4.4	2.0	10.7	6	50	44	-
Total	40	7	4.7	2.2	10.3	18	45	37	-
ITA - One Year PLDK									
Boys	17	12	5.1	2.3	9.3	37	44	19	-
Girls	17	7	4.3	2.5	9.5	27	53	20	-
Total	34	10	4.7	2.4	9.4	32	49	19	-
TO-One year PLDK									
Boys	17	6	5.8	2.0	10.5	6	56	38	-
Girls	17	15	6.2	1.8	10.6	13	27	60	-
Total	34	10	6.0	1.9	10.5	10	42	48	-
ITA - Two Years PLDK									
Boys	11	9	3.5	2.0	12.2	-	45	55	-
Girls	11	-	4.5	2.6	11.5	-	27	73	-
Total	22	5	4.0	2.3	11.8	-	36	64	-
TO-Two years PLDK									
Boys	13	8	4.6	2.5	10.2	8	-	92	-
Girls	13	9	3.7	2.3	10.1	-	8	92	-
Total	26	9	4.1	2.4	10.2	4	4	92	-
Grand Total	200	9	4.6	2.2	10.3	19	36	45	-

* Educational level of the best educated parent

excellence in teaching was high. In contrast, the control teachers were not stimulated or supported in any way by the project. The children were simply tested at the beginning of the year and retested at the end of it. Thus, a very important part of the experiment treatment was the added incentives provided the experimental teachers, and not the control teachers.

Evaluation

Test data were secured in three areas of development: school achievement, language development, and verbal intelligence. The instruments used in the first and second year were essentially the same. The discussion of the instruments here is concerned with the second year of the study.

School Achievement

Since the Metropolitan Achievement Test (MAT) was used throughout the Nashville Metropolitan Schools, being routinely administered at the end of each school year, it was chosen for measuring academic achievement. The Primary Battery II was used. It consists of five subtests: word knowledge (WK), word discrimination (WD), reading comprehension (R), spelling (S), and arithmetic (A). The achievement testing took place from late March to mid-May. Actual grade placement at time of test averaged about 2.75 (mid-April). Achievement tests were administered by project personnel.

Language Development

Two measures of language ability were obtained on the children: the Illinois Test of Psycholinguistic Abilities and the Peabody Language Production Inventory. These were administered by psychologists and psychometric technicians.

The Illinois Test of Psycholinguistic Abilities (McCarthy and Kirk, 1963) was developed as an individual test of the psycholinguistic abilities of children between the ages of 2 1/2 and 9 years. It consists of nine subtests which measure two input channels (auditory and visual), two output channels (vocal and motor), and two levels of organization (representational and automatic-sequential). The nine subtests are: (1) auditory decoding, (2) visual decoding, (3) auditory-vocal-association, (4) visual-motor-association, (5) vocal encoding, (6) motor encoding, (7) auditory-vocal automatic, (8) auditory-vocal sequencing, and (9) visual-motor sequencing.

The Peabody Language Production Inventory (PLPI) is an unstandardized instrument developed expressly for use in this study. It is designed to measure the free speech of children through showing them a series of three pictures (a street scene, a good humor man scene, and an operating room scene), and asking them to tell a different story about each. The responses of the subjects are rated on three dimensions of performance: (1) level of abstraction (integrative story, description of action, description of content), (2) structural complexity (use of paragraphs, sentences, phrases, or words only), and (3) general (speech volume, speech quality, and attitude toward

the test.)

Verbal Intelligence

The verbal intelligence of the children was measured by means of the 1960 revision of the Stanford-Binet (S-B). It was selected instead of such individual intelligence tests as the Weschler Intelligence Scale for Children in that it has been demonstrated to be effective at the age and level of operation of the subjects used in the present study. This test was administered by psychologists.

Results and Discussions

Results of the investigation are reported for each of the three areas of functioning for which data were collected: school achievement, language development, and intelligence. The results at the end of one year have been reported earlier by Dunn and Mueller (1966); therefore, only a summary of these results is included here. These were:

(1) Level #1 of the PLDK stimulated oral language development significantly as measured by the Illinois Test of Psycholinguistic Abilities (ITPA), for both the boys and girls.

(2) Intellectual growth, as measured by the 1960 Stanford Binet (S-B), was enhanced significantly by Level #1 of the PLDK, with ITA and PLDK complementing each other significantly more for boys, than for girls.

(3) Level #1 of the PLDK, in combination with ITA, was more effective for boys than girls in stimulating reading skills, as measured by the Metropolitan Achievement Test (MAT), but both sexes learned to read better in ITA (with or without PLDK), than the controls in a basic reading program.

For the second year, treatment groups 2 and 3 were split creating groups 4 and 5. Since the pretest data indicated significant differences in IQ, MA, and LA as a result of this regrouping, analyses of covariance (correcting for IQ differences among groups) were used in examining gains in achievement and language age.

School Achievement

Grade equivalent scores derived from the MAT are presented in Table IV for the total experimental sample and for the various sub-groups. Due to differences in IQ, the reader should be reminded that conclusions must not be drawn from the data as observed in the table. Results from the analyses of covariance are presented in Tables V, VI, VII, and VIII. For word knowledge, word discrimination, and reading, significant differences were observed on all three main effects, namely ITA versus conventional reading, PLDK versus no PLDK, and sex. The interaction effect between ITA and PLDK was significant. Children using ITA made significantly greater gains than those in the conventional program; children receiving PLDK for two years did better than those receiving no PLDK or one year PLDK; and girls did

Table IV

Means and Standard Deviations for School Achievement Data (Grade Equivalent Scores) as Measured by the Metropolitan Achievement Test

Treatment Group	N	MAT WK $\bar{X}$	MAT WK S	MAT WD $\bar{X}$	MAT WD S	MAT R $\bar{X}$	MAT R S	MAT S $\bar{X}$	MAT S S
ITA only									
Boys	22	2.564	.904	2.818	1.285	2.532	.920	2.586	1.359
Girls	22	2.664	.684	3.332	.803	2.550	.678	3.059	1.055
Total	44	2.614	.794	3.075	1.090	2.541	.799	2.823	1.226
Control (TO only)									
Boys	20	2.485	.427	3.090	.974	2.460	.589	3.395	.896
Girls	20	2.835	.501	3.965	.640	3.030	.577	4.100	.659
Total	40	2.660	.492	3.528	.926	2.745	.644	3.748	.855
ITA-One year PLDK									
Boys	17	2.376	.782	2.676	1.060	2.294	.661	2.500	.949
Girls	17	2.788	.752	3.224	1.052	2.753	.727	3.041	1.125
Total	34	2.582	.784	2.732	1.560	2.524	.723	2.771	1.061
TO-One year PLDK									
Boys	17	2.094	.334	2.294	.781	2.000	.324	2.076	.685
Girls	17	2.306	.501	2.871	1.164	2.465	.720	2.788	1.210
Total	34	2.200	.433	2.582	1.019	2.232	.598	2.432	1.034
ITA-Two years PLDK									
Boys	11	3.200	.646	3.991	.701	3.264	.533	3.873	.709
Girls	11	3.473	.522	4.300	2.908	3.482	.600	3.927	.705
Total	22	3.336	.590	4.145	.690	3.373	.565	3.900	.690
TO-Two years PLDK									
Boys	13	2.423	.691	2.231	.688	2.623	.951	2.669	.888
Girls	13	2.531	.584	2.908	.841	2.800	.723	3.069	.943
Total	26	2.477	.629	2.569	.828	2.712	.832	2.869	.920
Total									
Boys	100	2.488	.716	2.812	1.088	2.479	.768	2.799	1.110
Girls	100	2.730	.670	3.413	.993	2.801	.725	3.315	1.080
Total	200	2.609	.702	3.112	1.082	2.640	.762	3.057	1.122

Table V

Analysis of Covariance of Word Knowledge Subtest Scores on the Metropolitan Achievement Test

Source of Variation	Degree of Freedom	Sum of Squares y	Sum of Squares x	Sum of Products xy	Corrected Sum of Squares y	Degree of Freedom	Mean Squares	F ratio
A(ITA vs No ITA)	1	4.682	22.445	-10.251	5.257	1	5.257	15.462*
B(PLDK)	2	6.577	2215.304	109.195	2.364	2	1.182	3.473*
C(Sex)	1	2.928	89.255	16.093	2.117	1	2.120	6.226*
A x B interaction	2	6.650	460.363	- .399	6.932	2	3.466	10.185*
A x C interaction	1	.000	1.435	- .007	.000	1	.000	.000
B x C interaction	2	.135	154.883	4.095	.092	2	.046	..135
A x B x C	2	.578	147.742	9.146	.191	2	.095	.279
Errors	188	76.593	20225.928	511.872	63.639	187	.340	
Totals	199	98.144	23317.355	639.743	80.592			

*$F_{.95}$ = 3.04

Table VI

Analysis of Covariance of Word Discrimination Subtest Scores on the Metropolitan Achievement Test

Source of Variation	Degree of Freedom	Sum of Squares y	Sum of Squares x	Sum of Products xy	Corrected Sum of Squares y	Degree of Freedom	Mean Squares	F ratio
A(ITA vs No ITA)	1	4.836	22.445	-10.418	5.388	1	5.388	6.528*
B(PLDK)	2	12,357	2215.304	93.564	9.090	2	4.545	5.507*
C(Sex)	1	18.060	89.255	39.966	16.140	1	16.140	19.556*
A x B Interaction	2	31.358	460.363	4.475	31.377	2	15.688	19.009*
A x C interaction	1	.732	1.435	.424	.676	1	.676	.818
B x C interaction	2	.280	154.883	2.284	.394	2	.197	.238
A x B x C	2	.359	147.742	3.934	.234	2	.117	.1414
Errors	188	164.836	20225.928	460.710	154.342	187	.825	
Totals	199	232.819	23317.355	594.938	217.639			

*$F_{.95} = 3.04$

Table VII

Analysis of Covariance of Reading Subtest Scores on the Metropolitan Achievement Test

Source of Variation	Degree of Freedom	Sum of Squares y	Sum of Squares x	Sum of Products xy	Corrected Sum of Squares y	Degree of Freedom	Mean Squares	F ratio
A(ITA vs No ITA)	1	1.217	22.445	-5.226	1.568	1	1.568	3.941*
B(PLDK)	2	11.405	2215.304	151.481	4.411	2	2.206	5.543*
C(Sex)	1	5.184	89.255	21.413	3.946	1	3.946	9.917*
A x B interaction	2	6.307	460.363	-8.658	7.116	2	3.558	8.942*
A x C interaction	1	.605	1.435	.385	.571	1	.571	1.435
B x C interaction	2	.558	154.883	8.518	.365	2	.182	.459
A x B x C	2	.995	147.742	12.365	.382	2	.191	.480
Errors	188	89.349	20225.928	549.701	74.409	187	.398	
Totals	199	115.620	23317.355	729.980	92.767			

*$F_{.95} = 3.04$

Table VIII

Analysis of Covariance of Spelling Subtest Scores on the Metropolitan Achievement Test

Source of Variation	Degree of Freedom	Sum of Squares y	Sum of Squares x	Sum of Products xy	Corrected Sum of Squares y	Degree of Freedom	Mean Squares	F ratio
A(ITA vs No ITA)	1	.045	22.445	1.005	.006	1	.006	.007
B(PLDK)	2	21.568	2215.304	139.609	15.694	2	7.847	8.706*
C(Sex)	1	13.313	89.255	34.314	11.476	1	11.476	12.732*
A x B interaction	2	32.480	460.363	-34.798	34.596	2	17.298	19.192*
A x C interaction	1	.627	1.435	.392	.608	1	.608	.675
B x C interaction	2	1.206	154.883	13.106	.921	2	.460	.511
A x B x C	2	.135	147.742	-.104	.051	2	.025	.028
Errors	188	181.417	20225.928	510.014	168.557	187	.901	
Totals	199	250.790	23317.355	663.539	231.908			

*$F_{.95} = 3.04$

better than boys. The interaction was accounted for almost exclusively by the superior performance of the ITA plus two years PLDK group.

For spelling, only two main effects were significant, i.e., PLDK versus no PLDK, and sex. There was no significant main-effect difference between ITA and the conventional reading program. However, the results were complicated by the significant interaction effect between ITA and PLDK. Again, as with reading, children receiving PLDK for two years performed better in spelling than those receiving no PLDK or one year PLDK, and girls did better than boys. The interaction effect was caused by the superiority of the ITA plus two year PLDK group and the control group, over the other groups.

Based on the reading results, it can be concluded that ITA is more effective than the conventional program with or without PLDK; that two years of PLDK is more effective than one year PLDK or no PLDK; and that the combination of ITA plus two years PLDK is more effective than any other treatment or combination of treatments. The interaction effect in spelling seems to be unexplainable. True, the ITA plus two year PLDK group exceeded all other experimental groups as it did in reading, but the controls also did better in spelling than the other experimental groups.

Language Ability

Table IX presents the language data derived from the ITPA. Table X reports the results of the analysis of covariance (taking IQ into consideration) of the language age scores. Only one main effect was significant, i.e., PLDK versus no PLDK. No significant interaction effect was observed. Those children receiving either one or two years PLDK made greater language gains than children not receiving PLDK. These results were confirmed by the findings of the analysis of variance of posttest scores on the PLPI (See Table XI). Therefore, by two independent measures, the effectiveness of the use of PLDK in fostering language growth was confirmed. Also, the use of PLDK for two years had greater effect than using it for one year.

Intellectual Ability

The pretest, postest, and gain scores on MA and IQ are reported in Table IX. Tables XII and XIII present analyses of variance of MA and IQ gains respectively. As seen in Table XII, there was a significant main effect in MA gain scores, indicating that two years of PLDK enhanced intellectual development appreciably over none or one year of PLDK. (However, this main effect was not statistically significant for IQ gain scores, as seen in Table XIII, due probably to the initial, pretest, chronological and IQ score differences among groups--See Table 1--which appeared to make the effects of the MA gains for older Ss smaller than the same gains for younger Ss when reflected in IQ scores.) In any event, two similar significant interactions were found in both Tables XII and XIII for reading methods vs PLDK, and for sex vs PLDK. For the ITA groups, two year PLDK produced a greater gain in intellectual development than the one year PLDK which in turn produced a greater gain than the no PLDK group. For the conventional reading program, the one year PLDK groups made the lowest gain. These differences accounted for the first interaction. For the interaction between PLDK and sex, boys did better than girls

Table IX

Means and Standard Deviation for Intellectual Language Development

Pre, Post and Gain Scores

Treatment Group	N		SB - IQ Pretest	SB - IQ Posttest	SB - IQ Gain	SB - MA Pretest	SB - MA Posttest	SB - MA Gain	ITPA - LA Pretest	ITPA - LA Posttest	ITPA - LA Gain
ITA only											
Boys	22	$\bar{X}$	84.73	88.68	3.95	63.36	85.91	22.55	60.59	79.73	19.14
		S	12.22	12.15		8.65	11.80		9.57	14.50	
Girls	22	$\bar{X}$	84.18	86.36	2.18	64.68	84.64	19.95	60.55	78.23	17.68
		S	11.73	10.52		8.99	10.60		7.61	11.44	
Total	44	$\bar{X}$	84.45	87.52	3.07	64.02	85.27	21.25	60.57	78.98	18.41
		S	11.84	11.29		8.74	11.11		8.55	12.93	
Control											
Boys	20	$\bar{X}$	80.90	90.30	9.40	61.60	87.85	26.25	59.95	76.15	16.20
		S	11.78	10.85		8.04	9.54		7.69	8.15	
Girls	20	$\bar{X}$	84.65	94.25	9.60	63.30	89.55	26.25	62.45	78.40	15.95
		S	7.86	10.88		5.48	10.12		6.61	6.85	
Total	40	$\bar{X}$	82.78	92.28	9.50	62.45	88.70	26.25	61.20	77.28	16.08
		S	10.07	10.91		6.85	9.75		7.19	7.52	
ITA - One year FLDK											
Boys	17	$\bar{X}$	77.76	90.82	13.06	61.12	88.53	27.41	60.06	81.35	21.29
		S	10.88	11.04		7.92	11.62		7.46	9.87	
Girls	17	$\bar{X}$	82.06	83.88	1.82	63.35	82.53	19.18	58.88	80.41	21.53
		S	10.37	9.94		7.66	6.32		6.39	6.55	
Total	34	$\bar{X}$	79.91	87.35	7.44	62.23	85.53	23.30	59.47	80.88	21.41
		S	10.69	10.93		7.75	9.70		6.87	8.26	

- continued

Table IX - continued
Means and Standard Deviation for Intellectual Language Development
Pre, Post and Gain Scores

Treatment Group	N		SB - IQ			SB - MA			ITPA - LA		
			Pretest	Posttest	Gain	Pretest	Posttest	Gain	Pretest	Posttest	Gain
To-One year FLDK											
Boys	17	$\bar{X}$	83.59	87.35	3.76	65.35	87.06	21.71	62.24	84.59	22.35
		S	11.94	12.82		7.20	8.43		6.87	9.47	
Girls	17	$\bar{X}$	85.59	85.41	.18	67.24	85.18	17.94	63.00	79.53	16.53
		S	8.86	10.41		7.04	7.58		8.71	8.64	
Total	34	$\bar{X}$	84.59	86.38	1.79	66.29	86.12	19.83	62.62	82.06	19.44
		S	10.40	11.54		7.08	7.95		7.73	9.29	
ITA - Two year FLDK											
Boys	11	$\bar{X}$	91.73	95.45	3.73	68.55	92.00	23.45	62.64	87.64	25.00
		S	6.92	7.66		3.08	7.32		4.30	9.12	
Girls	11	$\bar{X}$	91.91	99.27	7.36	67.82	94.36	26.55	66.09	90.18	24.09
		S	9.33	8.82		5.88	8.24		6.47	10.18	
Total	22	$\bar{X}$	91.82	97.36	5.54	68.18	93.18	25.00	64.36	88.91	24.55
		S	8.02	8.30		4.59	7.70		5.64	9.52	
To-Two year FLDK											
Boys	13	$\bar{X}$	91.23	94.69	3.46	71.92	96.00	24.08	70.08	96.08	26.00
		S	7.38	13.29		6.34	10.89		7.88	9.25	
Girls	13	$\bar{X}$	88.23	97.46	9.23	67.00	95.08	28.08	63.15	88.54	25.38
		S	10.13	17.33		6.23	13.18		6.59	11.47	
Total	26	$\bar{X}$	89.73	96.08	6.35	69.46	95.54	26.08	66.62	92.31	25.69
		S	8.82	15.19		6.65	11.86		7.95	10.91	
TOTAL	200	$\bar{X}$	84.86	90.44	5.58	64.96	88.35	23.40	62.06	82.31	20.26
		S	10.82	12.06		7.65	10.44		7.75	11.10	

Table X

Analysis of Covariance of Language Age Gain Scores as Measured by the Illinois Test of Psycholinguistic Abilities

Source of Variation	Degree of Freedom	Sum of Squares y	Sum of Squares x	Sum of Products xy	Corrected Sum of Squares y	Degree of Freedom	Mean Squares	F ratio*
A(ITA vs no ITA)	1	57.245	22.445	-35.415	74.175	1	74.175	1.146
B (PLDK)	2	1895.004	2215.304	1640.254	1337.496	2	668.748	10.329*
C (Sex)	1	114.005	89.255	-101.115	163.698	1	163.698	2.528
A x B interaction	2	140.577	460.363	-69.975	174.363	2	87.182	1.346
A x C interaction	1	26.645	1.435	-2.285	28.509	1	28.509	.440
B x C interaction	2	44.572	154.883	-63.819	59.211	2	29.606	.457
A x B x C	2	134.212	147.742	85.103	110.552	2	55.276	.854
Errors	188	12795.735	20225.928	3732.137	12107.072	187	64.744	
Totals	199	15207.995	23317.355	5184.885	14055.076			

*$F_{.95} = 3.04$

Table XI

Analysis of Variance of Gain Scores on the

Peabody Language Production Inventory

Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	F Ratio
A(ITA vs No ITA)	1	612.500	612.500	3.038
B(FLDK)	2	1339.382	669.691	3.322*
C(Sex)	1	124.820	224.820	.619
A x B Interaction	2	740.476	370.238	1.836
A x C Interaction	2	3.920	1.960	.010
B x C Interaction	2	115.724	57.862	.287
A x B x C	2	25.783	12.892	.064
Errors	188	37,899.715	201.594	
Totals	199	40,862.320		

*$F_{.95}$ =3.04

Table XII

Analysis of Variance of MA Gains as Measured

by the Stanford-Binet Intelligence Scale

Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	F Ratio
A(ITA vs No ITA)	1	78.125	78.125	1.197
B(PLDK)	2	463.804	231.902	3.554*
C(Sex)	1	153.125	153.125	2.347
A x B Interaction	2	664.270	332.135	5.090*
A x C Interaction	1	114.005	114.005	1.747
B x C Interaction	2	651.637	325.818	4.994*
A x B x C	2	8.561	4.280	.066
Errors	188	12,226.269	65.246	
Totals	199	14,399.795		

*$F_{.95}$ = 3.04

Table XIII

Analysis of Variance of IQ Gains as Measured

by the Stanford-Binet Intelligence Scale

Source of Variation	Degree of Freedom	Sum of Squares	Mean Squares	F Ratio
A(ITA vs No ITA)	1	46.080	46.080	.502
B(PLDK)	2	96.122	48.061	.524
C(Sex)	1	158.420	158.420	1.727
A x B Interaction	2	1370.422	685.221	7.468*
A x C Interaction	1	204.020	204.020	2.224
B x C Interaction	2	1110.566	555.283	6.052*
A x B x C	2	56.035	28.018	.305
Errors	188	17249.035	91.750	
Totals	199	20290.720		

*$F_{.95}$ = 3.04

with one year PLDK, but the girls exceeded the boys when the PLDK treatment extended for two years. From these results, it would appear that Level #1 of the PLDK is especially suited to boys, whereas Level #2 appears to favor girls. Probably more credence should be placed in the MA than in the IQ scores since the former are more basic and more nearly equivalent to LA scores. If one does so, two continuous years of PLDK lessons seem to be effective in stimulating intellectual growth. Needless to say, the decrement in intellectual growth after two years, of Ss who only had PLDK in their first school year but not in their second, is a matter of concern, and needs more study.

Summary

The purpose of this three-year study was to investigate, with disadvantaged primary grade children, the efficacy of the ITA in teaching beginning reading and the PLDK Levels #1, #2, and #3, in stimulating oral language and verbal intelligence. The study began in the fall of 1964 when the children entered the first grade. This report covers the first two years of the investigation. From 17 classes in nine schools, six procedures were carried out: (1) four teachers taught ITA making the transition into traditional orthography late in the first year and in the first half of the second year, (2) two teachers taught ITA plus using PLDK for one year, (3) two teachers taught conventional reading plus PLDK for one year, (4) two teachers taught ITA plus two years of PLDK, (5) two teachers taught conventional reading plus two years of PLDK, and (6) a control group using the conventional reading approach was drawn from five classes.

Both the ITA and PLDK, as well as the conventional reading programs were taught by regular classroom teachers in self-contained classes. Posttesting for both years was begun in late March and completed in mid-May. The experimental teachers were given pre-service training on their experimental treatment(s), were provided a small salary supplement, had in-service sessions bi-weekly during the first year and periodically during the second year, and were observed frequently. Thus, motivation to excellence in teaching among the experimental teachers was high. Even though the pretesting and posttesting of the control children alerted their teachers that pupil progress was being monitored, the Hawthorne Effect among the experimental groups must be considered as a possible explanation of the results.

Pupil progress was measured in three areas: school achievement, language development, and intellectual growth. Based on results from the Metropolitan Achievement Test, children utilizing ITA were significantly advanced in reading achievement over those in the conventional reading program. Those children who received both ITA and two years of PLDK made more reading progress than any other group. Furthermore, after two years, the children who began in ITA were as effective in spelling in traditional orthography as the children who learned to read initially in a conventional reading program.

The scores from the Illinois Test of Psycholinguistic Abilities and the Peabody Language Production Inventory both indicate the beneficial effects of PLDK upon language growth, with a direct and positive relationship between the length of PLDK treatment and the amount of growth.

Two years of the systematic oral language stimulation program increased MA (but not IQ) scores significantly above that of one year or of no PLDK lessons when both sexes are combined. Girls made greater gains in intellectual development than boys with two years of the PLDK lessons, the reverse of the findings after one year of the treatment.

These findings, after two years of treatment, strongly suggest that the use of ITA plus two years of PLDK lessons facilitates both reading achievement and language growth with disadvantaged children. In terms of MA, but not IQ scores, growth in intellectual development was also enhanced. Too, it can be concluded that the use of ITA as a means of teaching beginning reading facilitated reading performance of deprived children after two years of school.

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